Guide for Cutting Oak Forests

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

AIS–5

Oak stand in an eastern forest.

GUIDE FOR CUTTING OAK FORESTS

Prepared by Northeastern Forest Experiment Station, Forest Service [1]

Description of the Forest

The oak forests of the Northeast consist almost entirely of second growth and show the effects of past heavy and repeated cutting and fires. Young stands in which sprouts make up 50 to 75 percent of the stems predominate. Repeated clear cutting has increased the proportion of inferior species of trees, and fire has increased the amount of butt rot.

The more common trees in the oak region as a whole are black, red, white, scarlet, and chestnut oaks; red maple, white ash, and hickory; and sometimes yellow poplar, hemlock, black locust, yellow and black birches, together with white, pitch, Virginia, and shortleaf pines in some areas. Common though less desirable species are black gum, dogwood, sassafras, Juneberry, aspen, and post oak. All of these, of course, are never found in any one woodland. In the border zones between oak and other kinds of forests, trees common to both will be mingled and practices suggested in this bulletin may not fully apply.

To bring back the oak forest to its full possibilities requires careful han-

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dling. A trained forester should be consulted if possible.[2]

Estimate the Stand

If you plan to sell standing trees for the buyer to cut, you will need to make a complete inventory of the salable trees on the tract. If you plan to cut your own timber and sell logs, measure a sample, perhaps 10 or 20 percent of the trees of cutting size, to get a fair idea of the volume and quality of timber available. Scale the logs after cutting to correct this rough estimate. *Knowing what you have to sell, you are in a position to secure a fair price for it.* In making an inventory, tally all trees 8 inches and larger in diameter breast high,[3] designating them as best fitted for saw timber, pulpwood, or perhaps just fuel wood, by using a form similar to that shown on pages 8 and 9. In general, trees 14 inches in diameter and larger should be used for saw timber. *Do not cut the trees below 14 inches unless they need thinning or are worthless as future sawlogs.*

The timber-estimating form, just referred to, is merely a guide. Figures from a ¼-acre tally of a fairly good stand have been inserted to illustrate its use. The headings dealing with products might be changed, where

[2] Your State Forester, extension forester, local Forest Service officer, foresters of other Government agencies, or private consulting foresters can help you estimate, mark, manage, and market your trees. Seek their counsel before cutting. For more detailed information, obtain a copy of U. S. Department of Agriculture Farmers' Bulletin No. 1210, Measuring and Marketing Farm Timber.

[3] Diameter breast high is at 4½ feet above average ground level. Stump diameter is an inch or two larger.

appropriate, to include mine props, or to exclude items not marketable.[4]

Plan a 30-Percent Cut of Sawlogs

A good general rule to follow in oak-type saw-timber stands is to harvest no more than about 30 percent of the total board-foot volume. The figures used on the sample form show 4,788 board feet per acre. Thirty percent would be 1,436 board feet per acre. The volume cut will be restored by growth within 14 to 20 years, when a second cut, yielding even higher value timber, should be possible.

Mark the trees to be cut, selecting the largest ones first and taking out the deformed, injured trees for fuel wood, charcoal, pulpwood or chemical wood. Leave clean-boled, straight trees of the superior species. As a rule, cut all sprouts in a clump or none at all. Free the crowns of trees to be reserved.

Be on the lookout for trees from which oak ship timber, ash handle stock, or yellow poplar veneer can be made, and try to market them for these purposes.

Some acres will be cut heavily and some lightly, but, over any 5 acres, the cut should add up to about 30 percent of the total board-foot volume. Where trees are mostly mature, cut clear in

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[4] Local markets determine the kind and value of trees suitable for saw or veneer logs. pulpwood, chemical wood or fuel wood. The local market and value of each product should be ascertained. Usually the best values are obtained for veneer or sawlogs. Smaller or less valuable trees and tops may be utilized for pulpwood or chemical wood if not needed for future saw timber, while fuel wood is usually made from tops or trees not suitable for other products.

patches of one-half acre or less instead of leaving too widely spaced individual trees, especially in swamp hardwoods; but do not cut clear on any larger scale without professional advice. Cut poor-risk trees under 14 inches, if you can do so without opening up the stand too much. In soft maple swamps of New England, however, cut clear with no limitation as to size of area.

In the oak-pine type of forest in New Jersey, pitch and shortleaf pine are far more valuable than the oak sprouts. Cut clear, leaving 15 to 20 vigorous, healthy-crowned pine seed trees of 10-inch diameter or larger per acre.

In Pennsylvania, Virginia pine is valuable chiefly for pulpwood and should be removed when mature, before cutting the associated oaks found in mixed stands on good sites. Virginia pine occurs in pure stands on poor sites. Here, it should be maintained by leaving vigorous-crowned seed trees in approximately four groups of 6 to 8 trees each per acre, clear-cutting the remaining trees.

Small Trees

If the merchantable volume is made up of large logs, rather than many small ones, it will cost much less per thousand board feet to cut and haul. This will make for greater profit if you do your own logging; it should result in a better price if you sell stumpage, because the operator can log with less expense.

Lumber production from 10-inch trees requires 30 percent more labor than that from 18-inch trees, and 40-

percent more than that from 24-inch trees. The value of the product of 10-inch trees is usually less than two-thirds of that of 24-inch trees.

It takes almost twice as long to cut and peel 100 cubic feet of pulpwood from trees of 5 to 8 inches in diameter as from 11- to 17-inch trees. *A 20- to 30-percent increase in production per man-day can be had by restricting hardwood pulp cutting to trees more than 14 inches in diameter.*

A cordwood cutter can produce 2 cords from 12-inch trees in the time it takes to cut 1 cord from 4-inch trees.

Do Not Cut—

If the merchantable volume in the better species of trees 14 inches in diameter and larger is less than about 2,000 board feet per acre (except for specialty products such as an occasional ship oak which has high stumpage value). *To make a 30-percent cut in such understocked stands would be unprofitable and ruinous to the stand.* This does not mean, however, that thinning out dense stands of smaller trees for fuel wood, pulpwood, mine props or chemical wood should not be done. In the stand shown on the sample estimating form, 7 cords of fuel wood and perhaps ⅓ of the pulpwood, or about 7½ cords per acre, could be removed with benefit to the stand.

SCALING LOGS

Measure the volume of logs cut by using one of the log rules on page 7. The Doyle rule is most commonly used in the East, but it benefits the buyer by giving too low a volume for

logs under 28 inches in diameter. The Vermont or Humphrey rule (diameter by ½ for 12-foot logs), commonly used on the Eastern Shore of Maryland and Delaware, overestimates the volume of the smaller log lengths and diameters, but underestimates logs about 16 inches in diameter and larger. The International is the most accurate and the fairest rule. It allows a ¼-inch saw kerf and gives the lumber content of the log resulting from careful sawing by good methods. If another rule is proposed, check it against the values given on page 7 to see how much it varies from the International rule.

International (¼-inch) Rule

Diameter of log at small end, inside bark (inches)	Scale in board feet for log length of—				
	8 feet	10 feet	12 feet	14 feet	16 feet
8	15	20	25	35	40
10	30	35	45	55	65
12	45	55	70	85	95
14	65	80	100	115	135
16	85	110	130	155	180
18	110	140	170	200	230
20	135	175	210	250	290
22	170	215	260	305	355
24	205	255	310	370	425

Doyle Rule

8	8	10	12	14	16
10	18	23	27	32	36
12	32	40	48	56	64
14	50	62	75	88	100
16	72	90	108	126	144
18	98	122	147	171	196
20	128	160	192	224	256
22	162	202	243	283	324
24	200	250	300	350	400

Vermont Rule

8	21	27	32	37	43
10	33	42	50	58	67
12	48	60	72	84	96
14	65	82	98	114	131
16	85	107	128	149	171
18	108	135	162	189	216
20	133	167	200	233	267
22	161	202	242	282	323
24	192	240	288	335	384

(1) Diameter class [2] (inches)	Hardwoods									
	(2) Board feet per tree	(3) Cords per tree [3]	(4) Number of trees				(5) Volume, board feet	(6) Volume, cords		
			Saw timber	Pulp-wood	Chemi-cal wood	Fuel wood		Pulp-wood	Chemi-cal wood	Fuel wood
8	.....	0.20	.....	.....	.....	1	.....	.....	.....	0.20
9	.....	.25	.....	1	.....	.....	.....	0.25	.....	.....
10	42	.30	.....	1	.....	.....	.....	.30	.....	.....
11	61	.35	.....	5	.....	1	.....	1.75	.....	.35
12	75	.40	.....	5	.....	3	.....	2.00	.....	1.20
13	95	.48	.....	3	.....	.....	.....	1.44	.....	.....
14	114	.56	2	.....	.....	.....	228	.....	.....	.....
15	137	.65	1	.....	.....	.....	137	.....	.....	.....
16	160	.75	4	.....	.....	.....	640	.....	.....	.....
17	192	.85	1	.....	.....	.....	192	.....	.....	.....
18	224	.95	.....	.....	.....	.....	.....	.....	.....	.....
19	255	1.07	.....	.....	.....	.....	.....	.....	.....	.....
20	286	1.18	.....	.....	.....	.....	.....	.....	.....	.....
22	354	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	421	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	500	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	600	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	700	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, ¼-acre	.....	.....	8	15	.....	5	1,197	5.74	.....	1.75
Total per acre	.....	.....	32	60	.....	20	4,788	22.96	.....	7.00

[1] Tally in columns 4 and 9 the number of trees in each diameter class. Simple multiplication will then give the board-foot and cord volumes for each class. Where values for saw timber and cordwood overlap, distinguish in your tally between timber and cordwood trees.

[2] Diameter of tree measured at breast height (4½ feet). If you choose to group your trees by 2-inch classes, as

Estimating Form [1]

Softwoods									
(7) Board feet per tree	(8) Cords per tree [3]	(9) Number of trees				(10) Volume, board feet	(11) Volume, cords		
		Saw timber	Pulp-wood	Chemical wood	Fuel wood		Pulp-wood	Chemical wood	Fuel wood
.....	0.07	.....	.....	.....	.....	.....	.....	.....	.....
.....	.10	.....	.....	.....	.....	.....	.....	.....	.....
70	.13	.....	.....	.....	.....	.....	.....	.....	.....
91	.15	.....	.....	.....	.....	.....	.....	.....	.....
112	.18	.....	.....	.....	.....	.....	.....	.....	.....
141	.21	.....	.....	.....	.....	.....	.....	.....	.....
170	.26	.....	.....	.....	.....	.....	.....	.....	.....
207	.31	.....	.....	.....	.....	.....	.....	.....	.....
244	.38	.....	.....	.....	.....	.....	.....	.....	.....
282	.44	.....	.....	.....	.....	.....	.....	.....	.....
320	.53	.....	.....	.....	.....	.....	.....	.....	.....
370	.61	.....	.....	.....	.....	.....	.....	.....	.....
420	.70	.....	.....	.....	.....	.....	.....	.....	.....
500	.78	.....	.....	.....	.....	.....	.....	.....	.....
590	.....	.....	.....	.....	.....	.....	.....	.....	.....
690	.....	.....	.....	.....	.....	.....	.....	.....	.....
800	.....	.....	.....	.....	.....	.....	.....	.....	.....
970	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

8. 10, 12, etc., remember that in classifying, diameters greater than the odd inch go in the higher class. (Example: A tree 11.1 or 13.0 inches is in the 12-inch class; one from 9.1 to 11.0 inches is in the 10-inch class.)

[3] This is for standard 48-inch cords. For 52-inch cords, decrease each item by 7.5 percent. For 60-inch cords decrease each item by 20 percent.

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